3rd-Annual

SPE AUTOMOTIVE COMPOSITES CONFERENCE

SOCIETY OF PLASTICS ENGINEERS Automotive & Composites Divisions

Polymer Composites

Cost-Effective Solutions for Lighter, Safer Vehicles

September 9-10, 2003

MSU Management
Education Center

811 W. Square Lake Road
Troy, MI, USA

2003 ACCE Chair Welcome

On behalf of the Society of Plastics Engineers' Automotive and Composites Divisions, welcome to the 3rd-Annual Automotive Composites Conference! Composite materials continue to gain acceptance and use in automotive applications, largely due to their ability to reduce vehicle weight and improve safety in a cost-effective manner.

SPE has designed this program to provide the most comprehensive automotive-focused composites conference in the world, featuring presentations on proven, real-world technologies. Two new subject areas are highlighted in this year's technical program:

- *Advancements in Reinforcement Technologies* was added to explore recent developments demonstrating the benefits of mixed-reinforcement and mixed-material technologies. These hybrid structures are being used to create unique new materials with tailored properties that successfully address the concerns of today's automakers.
- *Leading-Edge Composite Vehicles* is designed to open discussion of how technologies featured in exotic cars could be translated to the mass-production environment. Both North American and European technical developments are featured.

In addition, we continue technical sessions in the areas of:

- New Composite Materials, Processes and Applications;
- Composites in Commercial Transportation;
- Enabling Technologies; and
- Bonding and Joining.

Many new technologies and practical solutions are featured in these sessions.

Distinguished keynote speakers provide additional real-world experience in the areas of automotive composites industry successes and challenges, intellectual property protection, use of economic analysis during technology development, and carbon fiber for automotive applications.

You also have the opportunity to talk one-on-one with industry experts, customers, suppliers, and other partner companies by visiting the exhibits and attending Tuesday evening's reception. We hope you will be able to make the most of the Automotive Composites Conference & Exposition's opportunity for learning and networking.

This conference is successful because of the exceptional support provided by our sponsors, exhibitors, and volunteers. We appreciate your attendance and welcome your feedback to improve the content and format for next year.

Best regards,

Renita Jones
Chair – 2003 SPE Automotive Composites Conference
North American Product Manager, BP–Curv™ Composites

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conference AGENDA

TUESDAY

	Auditorium	Amplitheatre 101	Amplitheatre 102
7:30-8:15	REGISTRATION, BREAKFAST & EXHIBITS Lobby		
8:15-8:30	INTRODUCTION/GREETINGS Renita Jones - Conference Chairperson, BP - Curv™ Composites		
8:30-9:15	Keynote Speaker - Steve Loud, Composites News International *Composites, Today & Tomorrow: An Editor's Eye View*		
	COMMERCIAL TRANSPORT	NEW MATERIALS I	PROCESSING I
9:15-9:45	Brian Knouff Delphi Advanced Composites Engineering *The All Composite One-Piece Bumper*	Michael Siwajek ThyssenKrupp Budd Company *TCA and Contributions Made to Improve SMC Paintability*	Terry Seagrave Bayer Polymers LLC *Structural RIM Choices for Today's Automotive Design*
9:45-10:15	Edward Zenk International Truck & Engine Corp. *Composite Use in Heavy Trucks*	Lora Mason Ashland Specialty Chemical Company *Tough Sheet Molding Compound*	Klaus Gleich and Ed McDade Southern Research Institute and Bruggemann Chemical US *Nylon - VARTM, RTM and SRIM for Composite Applications*
10:15-10:30	COFFEE BREAK & EXHIBITS Lobby		
10:30-11:00	Cliff Eberle and Mark T. Smith Oak Ridge National Laboratory and Pacific Northwest National Laboratory *Heavy Vehicle Mass Reduction Utilizing Polymer Composites*	Peter W. Vaccarella Ashland Specialty Chemical Company *Renewable Source Materials Phase II*	Frank Henning, Heinrich Ernst and Richard Brüssel J. Dieffenbacher GmbH & Co. *Innovative Process Technology LFT-D-NF Offers New Possibilities for Emission Reduced Long-Natural Fiber-Reinforced Thermoplastic Components*
11:00-11:30		Klaus Gleich and Allan Murray Southern Research Institute and Ecoplexus, Inc. *Recent Developments in High Performance Thermoplastic Composites*	Manfred Bruemmer J. Dieffenbacher GmbH & Co. *Tailored LFT-D Technology*
11:30-12:45	LUNCH & EXHIBITS Lobby		
12:45-1:30	Keynote Speaker - David Hill, General Motors Corporation *Composites in High Performance Cars*		
	LEADING-EDGE COMPOSITE VEHICLES	NEW MATERIALS II	NEW APPLICATIONS
1:30-2:00	Dale Brosius Brosius Management Consulting *Carbon Fiber: The Automotive Material of the Twenty-First Century Starts Fulfilling the Promise*	A. K. Mohanty, W. Liu, L. T. Drzal, M. Misra, J.V. Kurian, R.W. Miller and N. Strickland Michigan State University & E. I. du Pont de Nemours and Co., Inc. *Biobased Poly(trimethylene terephthalate): Opportunity in Structural Composite Applications*	Willem Lossy and Phil Beasley Vyncolit *New Application Technologies in Phenolic Moldable Composites*
2:00-2:30	Mario Saccone Dallara Automobili *Composite Design Procedures for Racing Cars*	H. Miyagawa, A. K. Mohanty, M. Misra, and L. T. Drzal Michigan State University *Bio-Based Epoxy/Clay Nanocomposites as a New Matrix for Carbon Fiber Reinforced Composites: Thermophysical and Mechanical Properties Evaluation*	Steve Crawford, Mark Dixon, and Paul Gramann DaimlerChrysler, Dana Corporation, and The Madison Group: PPRC *Development of the Fiber Reinforced Thermoset DaimlerChrysler 4.7L V-8 Engine Valve Cover*

conference
AGENDA

TUESDAY

	Auditorium	Amplitheatre 101	Amplitheatre 102
2:30-3:00	COFFEE BREAK & EXHIBITS Lobby		
	LEADING-EDGE COMPOSITE VEHICLES	NEW MATERIALS II	NEW APPLICATIONS
3:00-3:30	Mark Voss, John Remy and Nancy Pottish General Motors Corporation and MacLean Vehicle Systems *Development of the Class-A Carbon Fiber Hood for the 2004 Chevrolet Corvette Z06*	Sean P. Walsh Reichhold, Inc. *Impact-Tolerant SMC Resins for Demanding Structural Applications*	H. Dittmar, T. Hofmann, D. LoPresti, B. Vos and D. Urban Quadrant Plastic Composites *New 2-Layer Automotive Body-Panel System Using Lightweight Thermoplastic Composite Backside & Aesthetic Surfaces*
3:30-4:00	David Leone General Motors Corporation *Composites in the Cadillac XLR*	Brian Hull Quantum Composites, Inc. *Cost Effective Use of Carbon Fiber SMC*	Scott Wellman, Ron Averill and Johanna Burgueño NVH Concepts and Red Cedar Technology *Advanced Technologies for Design and Fabrication of Composite Automotive Components*
4:00-4:30	Joe Summers SP Systems *Class A Carbon Fibre Reinforced Plastic(CFRP) Body Panels on the Mg Rover SV*	Dennis Northrop Avery Dennison Corporation *Decorative Laminates For Thermoforming and Insert Molding Processes*	Tetsu Kyono, Yukitane Kimoto and Yasuyuki Kawanomoto Toray Composites (America), Inc. *Carbon Fiber Composite Applications for Auto Industries*
4:30-5:00	Attilio Masini & Paolo Feraboli Automobili Lambourghini, S.p.A *Carbon/Epoxy Composites for the Lamborghini Murcielago*	Tom Balch, Karl Gust and John Gilbert BASF Corporation *Dual Cure UV Sealer Review*	Charles Weber, Scott Ledebuhr and Garek Barum Composite Products, Inc. *One Piece DLFT Automotive Running Boards*
5:00-7:00	RECEPTION & EXHIBITS Lobby		

WEDNESDAY

7:30-8:30	BREAKFAST & EXHIBITS Lobby		
8:30-9:15	David Stewart Stewart Automotive Research, LLC *Economics as a Tool for Technology Development: Making Cost an Engineering Variable*		
	ENABLING TECHNOLOGIES I	ADVANCES IN REINFORCEMENTS I	BONDING & JOINING
9:15-9:45	Ravi Mayavaram, Mahender Reddy, David Stewart and John Tolle Altair Engineering Inc. and Stewart Automotive Research, LLC *Design and Optimization of Conformal Cooling Passages*	Derek Riley and Renita Jones BP – Curv™ Composites *Improvements in Impact and Abrasion Performance of Glass Fiber Thermoplastics by the Localized Introduction of Self Reinforced Polypropylene*	John Hill Ford Motor Company *Adhesively Bonded Structural Composites for Aston Martin Vehicles*

conference AGENDA

WEDNESDAY

	Auditorium	Amplitheatre 101	Amplitheatre 102
	ENABLING TECHNOLOGIES I	**ADVANCES IN REINFORCEMENTS I**	**BONDING & JOINING**
9:45-10:15	Allen Peng, Yorker Chang, Anthony Yang, Venny Yang and Fu Chin Chuang CoreTech System Co. & DSM Engineering Plastics *3D Fiber Orientation & Warpage Analysis of Injection-Molded Throttle Valve*	O. Khondker, U.S. Ishiaku, and H. Hamada Kyoto Institute of Technology *Fabrication, Processing & Mechanical Properties of Flat Braided Thermosetting Composites Using Natural & Coated Jute Yarn*	A. Droste, P. Naughton, B. Bowser, J. Röttger, S. Burr, O. Imam, M. Zeitler, T. Heuft, and A. Cawley Dow Automotive *Bonded Metal-Plastic Composite Structures – the future of lightweight, cost-effective performance*
10:15-10:30	**COFFEE BREAK & EXHIBITS** Lobby		
10:30-11:00	Christopher Rush, Joe Falque and Karen McRitchie Galorath Inc. *Real Time Cost Impact Assessment of Composite and Metallic Design Alternatives*	A. Nakai, D. Nakaami, T. Narita, H. Hamada and E. Fukui Kyoto Institute of Technology & Fukui Gyomo Co., Ltd. *Fabrication and Mechanical Properties of Multi-Axial Warp Knitted Thermoplastic Composites Using Micro-Braided Yarn*	Lynn Klett and Darrell Herling Oak Ridge National Laboratory and Pacific Northwest National Laboratory *Joining Composite Chassis Components on Heavy Trucks*
11:00-11:30	Karen Taminger and Robert A. Hafle NASA Langley Research Center *Electron Beam Freeform Fabrication: A Rapid Metal Deposition Process*	Sharad Kumar and Krishnamurthy Jayaraman Michigan State University *Performance of PP/Clay Nanocomposites with Edge Functionalized Clay*	K. Sugimoto, A. Ochi, A. Nakai and H. Hamada Kyoto Institute of Technology *Mechanical Properties of Matrix Hybrid Composites with Mechanical Joint*
11:30-12:30	**LUNCH & EXHIBITS** Lobby		
12:30-1:15	Keynote Speaker - William G. Abbatt, Brooks Kushman P.C. *Strategies for Intellectual Property Protection and Assest Management*		
	ENABLING TECHNOLOGIES II	**ADVANCES IN REINFORCEMENTS II**	**PROCESSING II**
1:15-1:45	Rick Dove ProMetal Division of Extrude Hone *Conformal Cooling with Solid Freeform Fabrication Technology: Issues and Opportunities*	Jon Jacobson Schmelzer Industries, Inc. *Surface Profile and Surfacing Veil: Reducing Printout with a Resin-Rich Surface*	Stephen T. Bowen PlastiComp, Inc. *Compounding with "Pushtrusion" Technology*
1:45-2:15	David Stewart and Xia-Yang Sheng Stewart Automotive Research, LLC *Electron Beam Welded Tooling*	Mark Goldhawk Dow Automotive *Carbon Fibre/RRIM Composites for Exterior Automotive Applications*	Changsheng Gan, Ronald F. Gibson and Golam M. Newaz Wayne State University *Energy Absorption in Thermoplastically Stamped Composite Grid Structures*
2:15-2:45	**COFFEE BREAK & EXHIBITS** Lobby		
2:45-3:15	Wei Xie TA Instruments *Applications of Thermal Analysis in Polymer & Composites Characterization*	Lanhong Xu, Tom Mase and Lawrence Drzal Michigan State University *Improving Adhesion Between Carbon Fibers and Vinyl Ester Resins*	Stephanie Ader and Rodolphe Mallet InoPlastic Omnium *Use of Composites for Rear Closures*
3:15-3:45		Hiroyuki Fukushima and Lawrence Drzal, Michigan State University *Graphite Nanoplatelets to Improve the Mechanical Electrical and Thermal Properties of Polymers*	
3:45-4:00	**CLOSING - Renita Jones** Auditorium		

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conference PRESENTATIONS

KEYNOTE SPEAKERS

Composites, Today & Tomorrow: An Editor's Eye View

Steve Loud
Composites News International

This keynote address reviews the major composites markets for advanced materials with attention to the role significant applications play.

Composites in High Performance Cars

David Hill
General Motors Corporation

This keynote address discusses the challenges and opportunities offered by advanced materials for use in vehicles with higher requirements for quality, appearance, cost efficiency, development time, and styling flexibility.

Economics as a Tool for Technology Development: Making Cost an Engineering Variable

David Stewart
Stewart Automotive Research, LLC

This keynote address discusses the importance of using techno-economic analysis as another dimension in engineering optimization to guide the decision-making process, reducing risk and increasing the yield of research.

Strategies for Intellectual Property Protection and Asset Management

William G. Abbatt
Brooks Kushman P.C.

This keynote address discusses management of a company's intellectual property assets, including the substantive tasks integrally involved in a company's IP endeavors, the procedural and reporting tasks, and a proposed model for allocating both the substantive and procedural tasks.

ADVANCEMENTS IN REINFORCEMENT TECHNOLOGY

Improvements in Impact and Abrasion Performance of Glass Fiber Thermoplastics by the Localized Introduction of Self Reinforced Polypropylene

Derek Riley and Renita Jones
BP–Curv™ Composites

This presentation discusses the use of a highly impact resistant, self-reinforced polypropylene composite to provide localized reinforcement in GMT and LFT components without increasing weight or compromising recyclability.

Fabrication, Processing & Mechanical Properties of Flat Braided Thermosetting Composites Using Natural & Coated Jute Yarn

O. Khondker, U.S. Ishiaku & H. Hamada
Kyoto Institute of Technology

This presentation discusses studies on the tensile and bending properties of flat braided thermosetting composites using jute yarns.

Fabrication and Mechanical Properties of Multi-Axial Warp Knitted Thermoplastic Composites Using Micro-Braided Yarn

Asami Nakai, Dai Nakaami, Tsutom Narita, Hiroyuki Hamada and Eisuke Fukui
Kyoto Institute of Technology and Fukui Gyomo Co., Ltd.

This presentation discusses research to fabricate multi-axial, warp-knitted thermoplastic-composite panels via a micro-braiding technique.

Performance of PP/Clay Nanocomposites with Edge Functionalized Clay

Sharad Kumar and Krishnamurthy Jayaraman
Michigan State University

This presentation discusses studies evaluating the use of three different clays on the mechanical properties of melt-processed PP/clay nanocomposites.

Surface Profile and Surfacing Veil: Reducing Printout with a Resin-Rich Surface

Jon Jacobson
Schmelzer Industries, Inc.

This presentation discusses the use of a surfacing veil for FRP laminates to dramatically reduce resin shrinkage at the surface, improving surface finish as well as speeding resin flow in closed tools, reducing demold times, protecting pultrusion dies, strengthening the gel coat, and improving bonding of the gel coat to the reinforcement.

Carbon Fibre/RRIM Composites for Exterior Automotive Applications

Mark Goldhawk
Dow Automotive

This presentation discusses the benefits of using carbon fiber in RIM polyurethane/polyurea composites to reduce weight, with discussion of processability, moldability, physical properties, paintability, and functional manufacturing for exterior body panels.

conference PRESENTATIONS

Improving Adhesion between Carbon Fibers and Vinyl Ester Resins

Lanhong Xu, Tom Mase and Lawrence Drzal
Michigan State University

This presentation discusses the influence of matrix cure-volume shrinkage on adhesion between carbon fiber and vinyl-ester resins and the benefits of a specially formulated epoxy-sizing agent to counteract such shrinkage.

Graphite Nanoplatelets to Improve the Mechanical Electrical and Thermal Properties of Polymers

Hiroyuki Fukushima and Lawrence Drzal
Michigan State University

This presentation discusses development and use of cost-effective graphite nanoplatelets to improve the thermal, mechanical, and electrical properties of polymer nanocomposites for use in fuel cells, batteries, and electrical-shielding components.

BONDING & JOINING

Adhesively Bonded Structural Composites for Aston Martin Vehicles

John Hill
Ford Motor Company

This presentation discusses the role of adhesives in the Aston Martin V12 Vanquish, a vehicle that is entirely bonded together with adhesives and makes use of 20+ composite parts.

Bonded Metal-Plastic Composite Structures - the future of lightweight, cost effective performance

A. Droste, P. Naughton, B. Bowser, J. Röttger, S. Burr, O. Imam, M. Zeitler, T. Heuft and A. Cawley
Dow Automotive

This presentation examines use of bonded metal-polypropylene composite structures for applications where stiffness, impact resistance, and functional integration are required as well as lower cost and weight.

Joining Composite Chassis Components on Heavy Trucks

Lynn Klett and Darrell Herling
Oak Ridge National Laboratory and Pacific Northwest National Laboratory

This presentation discusses work to overcome the major technical issues associated with joining thick fiber-reinforced composite sections, especially where it is important to have robust and economical attachment techniques to join composite parts to steel.

Mechanical Properties of Matrix Hybrid Composites with Mechanical Joint

Kenichi Sugimoto, Akihiro Ochi, Asami Nakai and Hiroyuki Hamada
Kyoto Institute of Technology

This presentation discusses the effects of using various stacking sequences and laminate thicknesses on the mechanical behavior of hybrid-composite parts for automobiles.

COMMERCIAL TRANSPORT

The All Composite One Piece Bumper

Brian Knouff
Delphi Advanced Composites Engineering

This presentation discusses the benefits of using single-piece composite bumpers – which are compatible with the new production environment – to replace steel or thermoplastics for Class 8 trucks.

Composite Use in Heavy Trucks

Edward Zenk
International Truck & Engine Corp.

This presentation provides an overview of composite use in heavy trucks in terms of new materials, new processes, and new applications.

Heavy Vehicle Mass Reduction Utilizing Polymer Composites

Cliff Eberle and Mark T. Smith
Oak Ridge National Laboratory and Pacific Northwest National Laboratory

This presentation discusses new DOE funding initiatives for using polymer composites to reduce mass in Class 8 trucks as a platform from which to subsequently migrate validated technology to passenger-vehicle use.

ENABLING TECHNOLOGIES

Design and Optimization of Conformal Cooling Passages

Ravi Mayavaram, Mahender Reddy, David Stewart and John Tolle,
Altair Engineering, Inc. and Stewart Automotive Research, LLC

This presentation discusses a new approach to optimizing mold cooling via a seamless combination of simulation and optimization tools under a unified framework.

conference PRESENTATIONS

3D Fiber Orientation & Warpage Analysis of Injection-Molded Throttle Valve

Allen Peng, Yorker Chang, Anthony Yang, Venny Yang and Fu Chin Chuang
CoreTech System Co., Ltd. and DSM Engineering Plastics

This presentation discusses the development of a new 3D technique for modeling fiber orientation and anisotropy for injection-molded plastics.

Real Time Cost Impact Assessment of Composite & Metallic Design Alternatives

Christopher Rush, Joe Falque and Karen McRitchie
Galorath Incorporated

This presentation discusses use of a process-based parametric cost model to evaluate real-time cost-impact assessments of composites and metallic design alternatives.

Electron Beam Freeform Fabrication: A Rapid Metal Deposition Process

Karen Taminger and Robert A. Hafle
NASA Langley Research Center

This presentation discusses a new layer-additive process for freeform fabrication of various metallic structures via electron beam technology.

Conformal Cooling with Solid Freeform Fabrication Technology: Issues & Opportunities

Rick Dove
ProMetal Division of Extrude Hone

This presentation compares benefits and attributes of various solid freeform rapid-tooling technologies for use in the production of plastic tooling.

Electron Beam Welded Tooling

David Stewart and Xia-Yang Sheng
Stewart Automotive Research, LLC

This presentation discusses the cost-saving use of electron beam welding to construct large tools that also deliver features such as conformal cooling and allow for the use of high-performance steels.

Applications of Thermal Analysis in Polymer & Composites Characterization

Wei Xie
TA Instruments

This presentation describes the use of thermal analysis techniques for the design, optimization, technical support, and QA/QC of polymers and polymer composites.

LEADING-EDGE COMPOSITE VEHICLES

Carbon Fiber: The Automotive Material of the Twenty-First Century Starts Fulfilling the Promise

Dale Brosius
Brosius Management Consulting

This presentation provides an overview of the current state of carbon fiber usage in automobiles in Europe, North America, and Japan, ranging from exotic "supercars," to niche vehicles, to mass-production applications.

Composite Design Procedures for Racing Cars

Mario Saccone
Dallara Automobili

This presentation discusses procedures for designing composite parts for racing cars.

Development of the Class-A Carbon Fiber Hood for the 2004 Chevrolet Corvette Z06

Mark Voss, John Remy and Nancy Pottish
General Motors Corporation and MacLean Vehicle Systems

This presentation discusses development and validation of a carbon-fiber hood – the first original-equipment painted CF exterior body panel on a production vehicle – for the '04 model year Corvette.

Composites in the Cadillac XLR

David Leone
General Motors Corporation

This presentation discusses selection and engineering of composite materials for the Cadillac XLR that enabled General Motors to enhance luxury and increase performance of this vehicle.

Class A Carbon Fibre Reinforced Plastic (CFRP) Body Panels on the MG Rover SV

Joe Summers
SP Systems

This presentation discusses the rapid development of carbon-fiber-reinforced syntactic resin body panels for the MG Rover SV.

Carbon/Epoxy Composites for the Lamborghini Murcielago

Attilio Masini and Paolo Feraboli
Automobili Lamborghini S.p.A

This presentation discusses the development of carbon / epoxy body panels and structural components for the Lamborghini Murcielago that are joined to the tubular steel chassis via hybrid adhesive bonding.

conference PRESENTATIONS

NEW APPLICATIONS

New Application Technologies in Phenolic Moldable Composites

Willem Lossy and Phil Beasley
Vyncolit

This presentation discusses the benefits of new-generation phenolic molding compounds vs. thermoplastics and metals in various engine and powertrain applications.

Development of the Fiber Reinforced Thermoset DaimlerChrysler 4.7L V-8 Engine Valve Cover

Steve Crawford, Mark Dixon and Paul Gramann
DaimlerChrysler, Dana Corporation and The Madison Group: PPRC

This presentation discusses the rapid design and development of a glass-reinforced vinyl ester thermoset composite for use in a new V-8 engine-valve cover, replacing a die-cast magnesium part at lower cost and weight.

New 2-Layer Automotive Body-Panel System Using Lightweight Thermoplastic Composite Backside & Aesthetic Surfaces

H. Dittmar, T. Hofmann, D. LoPresti, B. Vos and D. Urban
Quadrant Plastic Composites

This presentation discusses work on a two-layer body-panel system using a new, lighter weight thermoplastic composite backside and an aesthetic surface layer – either precoated aluminum or inherently colored thermoplastic or paint films – to meet Class A surface requirements for body panels.

Advanced Technologies for Design and Fabrication of Composite Automotive Components

Scott Wellman, Ron Averill and Johanna Burgueño
NVH Concepts and Red Cedar Technology

This presentation discusses the benefits of combining advanced manufacturing and design methods to realize novel composite solutions at a fraction of the weight of equivalent metal parts.

Carbon Fiber Composite Applications for Auto Industries

Tetsu Kyono, Yukitane Kimoto and Yasuyuki Kawanomoto
Toray Composites (America), Inc.

This presentation discusses the design and development of a carbon-fiber composite drive shaft, which provides weight and noise reduction and increased safety for a rear-drive passenger vehicle.

One Piece DLFT Automotive Running Boards

Charles Weber, Scott Ledebuhr and Garek Barum
Composite Products, Inc.

This presentation discusses development of a one-piece composite running board – via a patented in-line compounding technology – which replaces a 43-piece metal and plastic assembly at significant cost savings and half the weight.

NEW MATERIALS

TCA and Contributions Made to Improve SMC Paintability

Michael Siwajek
ThyssenKrupp Budd Company

This presentation discusses analysis work done to discover the root cause of defects in painted SMC parts, efforts to toughen the resin matrix to enhance paintability, subsequent testing, and current commercial applications that benefit from this technology enhancement.

Tough Sheet Molding Compound

Lora Mason
Ashland Specialty Chemical Company

This presentation discusses a new SMC formulation specifically developed to be more durable and resilient to micro-cracking, which is the primary source of paint problems in SMC parts requiring a Class A surface.

Renewable Source Materials Phase II

Peter W. Vaccarella
Ashland Specialty Chemical Company

This presentation discusses Phase II work on soy-based polyesters originally developed as SMC for farm-equipment applications and now being evaluated for spray-up, infusion, and RTM processes.

Recent Developments in High Performance Thermoplastic Composites

Klaus Gleich and Allan Murray
Southern Research Institute and Ecoplexus, Inc.

This presentation provides an overview of current technologies for producing high-performance thermoplastic composites, including properties, processing steps, benefits, and typical applications.

conference PRESENTATIONS

Biobased Poly(trimethylene terephthalate): Opportunity in Structural Composite Applications

A. K. Mohanty, W. Liu, L. T. Drzal, M. Misra, Joseph V. Kurian, Ray W. Miller and Nick Strickland
Michigan State University and
E. I. du Pont de Nemours and Company, Inc.

This presentation discusses work on injection moldable composite materials based on PTT and glass, whose properties may make them suitable for structural applications in automotive and building-product applications.

Bio-Based Epoxy/Clay Nanocomposites as a New Matrix for Carbon Fiber Reinforced Composites: Thermophysical and Mechanical Properties Evaluations

H. Miyagawa, A. K. Mohanty, M. Misra, and L. T. Drzal
Michigan State University

This presentation discusses work on bio-based epoxy nanocomposites reinforced with organo-montmorillonite clay and carbon fiber.

Impact-Tolerant SMC Resins for Demanding Structural Applications

Sean P. Walsh
Reichhold, Inc.

This presentation discusses work on a new generation of impact-tolerant structural thermoset resins that combine high modulus with the toughness of thermoplastics, and are amendable to use in high-volume manufacturing processes like SMC.

Cost Effective Use of Carbon Fiber SMC

Brian Hull, Quantum Composites, Inc.

This presentation discusses the best approach for using carbon-fiber-reinforced SMC in current and new applications requiring higher stiffness to maximize performance as well as cost.

Decorative Laminates For Thermoforming and Insert Molding Processes

Dennis Northrop
Avery Dennison Corporation

This presentation provides an overview of new developments and uses for decorative film laminates on thermoplastic parts.

Dual Cure UV Sealer Review

Tom Balch, Karl Gust and John Gilbert
BASF Corporation

This presentation discusses work on new rigid and flexible hybrid UV- / thermal-cure sealers for SMC that reduce porosity-induced defects such as paint-popping.

PROCESSING

Structural RIM Choices for Today's Automotive Design

Terry Seagrave, Bayer Polymers LLC

This presentation discusses two traditional technologies and one new honeycomb-core composite technology that have evolved out of extensive research with SRIM over the past two decades.

Nylon - VARTM, RTM and SRIM for Composite Applications

Klaus Gleich and Ed McDade
Southern Research Institute and Bruggemann Chemical US

This presentation discusses chemistry, processing, and properties of reactive thermoplastic composite technologies that are similar to thermosets yet combine the benefits of both thermoplastics and thermosets.

Innovative Process Technology LFT-D-NF Offers New Possibilities for Emission Reduced Long-Natural Fiber-Reinforced Thermoplastic Components

Frank Henning, Heinrich Ernst and Richard Brüssel
J. Dieffenbacher GmbH & Co.

This presentation discusses benefits, properties, and process modifications for LFT composites reinforced with long natural fibers.

Tailored LFT-D Technology

Manfred Bruemmer, J. Dieffenbacher GmbH & Co.

This presentation discusses the in-line compounding-compression process for LFT-reinforced components, which offer attractive development potential for future applications.

Compounding with "Pushtrusion" Technology

Stephen T. Bowen, PlastiComp, Inc.

This presentation discusses a patented new in-line compounding technology that combines continuous fiber reinforcement with molten polymer, creating fiber-reinforced compounds that can be processed in a variety of conventional thermoplastic molding processes.

Energy Absorption in Thermoplastically Stamped Composite Grid Structures

Changsheng Gan, Ronald F. Gibson and Golam M. Newaz
Wayne State University

This presentation discusses results from an analytical/experimental study of the energy-absorption characteristics of grid-stiffened composite structures under transverse loading.

Use of Composites for Rear Closures

Stephanie Ader and Rodolphe Mallet, InoPlastic Omnium

This presentation discusses engineering, economic, and manufacturing benefits of using composite solutions for rear closure applications.

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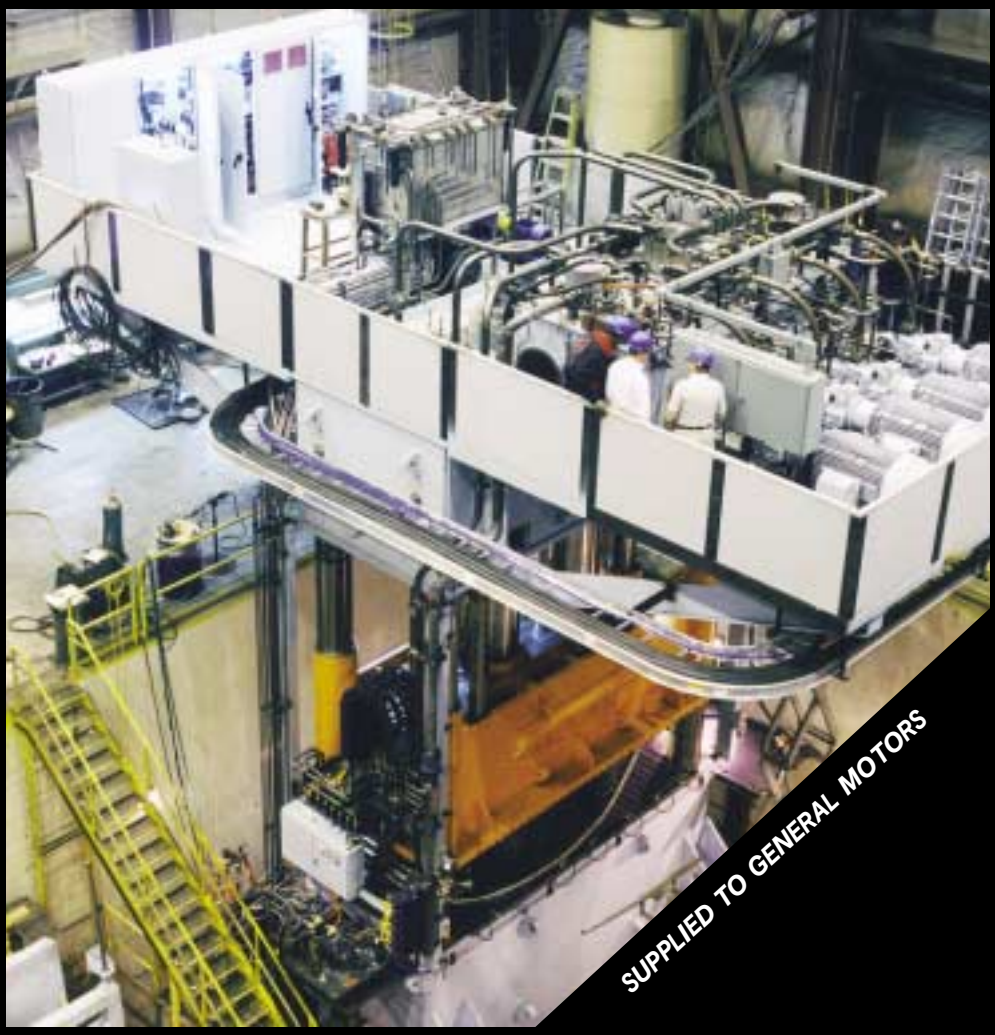

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